



DEPARTMENT OF PLANNING & BUILDING

BUILDING DIVISION

276 Fourth Avenue Chula Vista CA 91910

619-691-5272

619-585-5681 FAX

FORM 4603

TYPICAL RESIDENTIAL SINGLE STORY FRAMING SECTION

This handout describes how to prepare a typical framing section for single-story residential construction. One or more framing sections will be required as part of plans submitted for approval prior to permit issuance. For more information regarding plans for residential construction refer to Form 4601, "Single Family Residential/Duplex: Minimum Submittal Standards".

Additional information on the preparation of plans for a single family residence can be found in "2001 California Building Code." This publication may be ordered from the International Conference of Building Officials, 5360 Workman Mill Road, Whittier, California 90601.

I. WHAT IS A FRAMING DETAIL?

The California Building Code specifies that, for single family residential construction, all framing members shall be "anchored, tied and braced so as to develop the strength and rigidity necessary for the purposes for which they are to be used." A framing section is a cutaway view of the proposed construction that is used to show how these requirements are met. Depending on the design of your project, you may need to include more than one framing section. You must clearly show deviations in your sections wherever they occur.

Included in this handout are illustrations showing several typical framing sections and details. The illustrations depict conventional wood construction. All framing sections should be cross-referenced on the building plans using the floor, foundation and/or roof framing views. See Figure 1.

All framing sections should include enlarged views that detail roof and floor connections as well as lumber and footing sizes. For information on size and spacing of rafters, ceiling joists or floor joists, refer to Form 4602, "Span Tables: Roof & Floor Framing."

II. TYPICAL FRAMING DETAILS

Included in this handout are the following typical cross section views:

Figure 2 illustrates a framing section with slab floor, roof rafters and ceiling joists.

Figure 3 illustrates a framing section with slab floor and vaulted ceiling.

Figure 4 illustrates a typical framing section with raised floor, roof rafters and ceiling joists.

Figure 5 illustrates a typical framing section with slab floor construction and a shed roof.

III. TYPICAL DETAILS

Included in this bulletin are the following typical Details:

Documents referenced in this Information Bulletin

- 2001 California Building Code
- Form 4592, Minimum Construction Specifications
- Form 4605, Allowable Shear for Wood Stud Walls
- Form 4601, Single Family Residential/Duplex: Minimum Submittal Standards
- Form 4602, Span Tables: Roof & Floor Framing

Detail A illustrates a typical roof ridge connection when using rafters and ceiling joists.

Detail B illustrates a typical ridge beam connection when rafters are load bearing and ceiling joists will not be used.

Detail C illustrates a typical roof connection showing rafters and ceiling joists attached to bearing walls.

Detail D illustrates a typical roof connection showing a vaulted ceiling without ceiling joists attached to bearing walls.

Detail E illustrates a typical shed roof connection attached to bearing walls.

Figure F illustrates a typical bearing wall connection to a continuous footing with slab floor construction.

Figure G illustrates a typical bearing wall connection to a continuous footing with raised floor construction.

Figure H illustrates a typical girder connection to an interior pad footing for raised floor construction.

IV. COMPLETING YOUR FRAMING DETAILS

Items such as the size of all framing members, interior and exterior finishes, as well as the roof and floor covering must be specified on the plan. For more information refer to Form 4592, "Minimum Construction Specifications."

The framing sections and details shown in this bulletin are the most commonly used for single story room additions. You may include any illustration shown that relates to your project by completing the blank portions and attaching them to your plans. These illustrations do not reflect all additions or designs and can not be used in every case.

V. Bracing (Based on the California Building Code)

Braced wall lines shall consist of braced wall panels which meet the requirements for location, type and amount of bracing specified in Table 23-IV-C-1 (see page 12) and are in line or offset from each other by not more than 4 feet. Braced wall panels shall start at not more than 8 feet from each end of a braced wall line. All braced wall panels shall be clearly indicated on the plans. Construction of braced wall panels shall be by one of the following methods:

1. Wood boards of 5/8-inch net minimum thickness applied diagonally on studs spaced not over 24 inches on center.
2. Wood structural panel sheathing with a thickness not less than 5/16 inch for 16-inch stud spacing and not less than 3/8 inch for 24-inch stud spacing in accordance with Tables 23-II-A-1 and 23-IV-D-1 (see page 12).
3. Fiberboard sheathing 4-foot by 8-foot panels not less than 1/2 inch thick applied vertically on studs spaced not over 16 inches on center when installed in accordance with Section 2315.6 and Table 23-II-J (see Form 4605).
4. Gypsum board [sheathing 1/2 inch thick by 4 feet wide, wallboard or veneer base on studs spaced not over 24 inches on center and nailed at 7 inches on center with nails as required by Table 25-I (see page 13).
5. Particleboard wall sheathing panels where installed in accordance with Table 23-IV-D-2 (see page 12).
6. Portland cement plaster on studs spaced 16 inches on center installed in accordance with Table 25-I (see page 13).
7. Hardboard panel siding when installed in accordance with Section 2310.6 and Table 23-II-C (see page 12). For cripple wall bracing, see Section 2320.11.5. For Methods 1, 2, 3, 5, 6 and 7 each braced panel must be at least 48 inches in length, covering three stud spaces where studs are spaced 16 inches apart and covering two stud spaces where studs are spaced 24 inches apart.

For Method 4, each braced wall panel must be at least 96 inches in length when applied to one face of a braced wall panel and 48 inches when applied to both faces.

All vertical joints of panel sheathing shall occur over studs. Horizontal joints shall occur over blocking equal in size to the studding except where waived by the installation requirements for the specific sheathing

materials.

Braced wall panel sole plates shall be nailed to the floor framing and top plates shall be connected to the framing above in accordance with Table 23-II-B-1 (see Form 4592). Sills shall be bolted to the foundation or slab in accordance with Section 1806.6 and 1806.6.1. Where joists are perpendicular to braced wall lines above, blocking shall be provided under and in line with the braced wall panels.

VI. Alternate braced wall panels.

Any braced wall panel required by Section 2320.11.3 may be replaced by an alternate braced wall panel constructed in accordance with the following:

1. In one-story buildings, each panel shall have a length of not less than 2 feet 8 inches and a height of not more than 10 feet. Each panel shall be sheathed on one face with 3/8-inch-minimum-thickness plywood sheathing nailed with 8d common or galvanized boxnails in accordance with Table 23-II-B-1 (Form 4592) and blocked at all plywood edges. Two anchor bolts installed in accordance with Section 1806.6, shall be provided in each panel. Anchor bolts shall be placed at panel quarter points. Each panel end stud shall have a tie-down device fastened to the foundation, capable of providing an approved uplift capacity of not less than 1,800 pounds. The tie-down device shall be installed in accordance with the manufacturer's recommendations. The panels shall be supported directly on a foundation or on floor framing supported directly on a foundation which is continuous across the entire length of the braced wall line. This foundation shall be reinforced with not less than one No. 4 bar top and bottom.

2. In the first story of two-story buildings, each braced wall panel shall be in accordance with Section 2320.11.4, Item 1, except that the plywood sheathing shall be provided on both faces, three anchor bolts shall be placed at one-fifth points, and tie-down device uplift capacity shall not be less than 3,000 pounds.

Figure 1/ Floor Plan with Cross Referenced Section Views

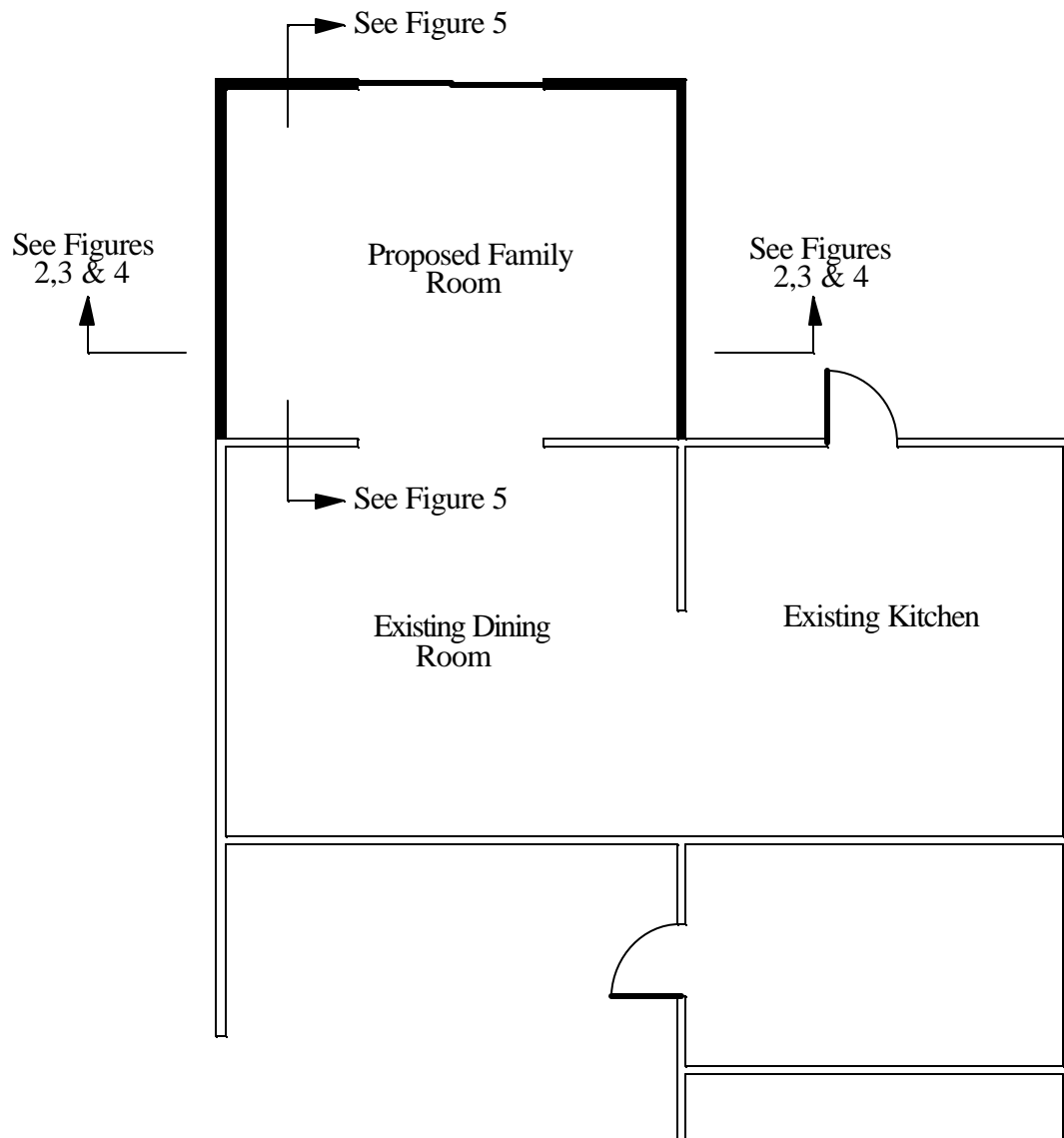


Figure 2/ Typical Cross Section View, Slab Floor with Ceiling Joist

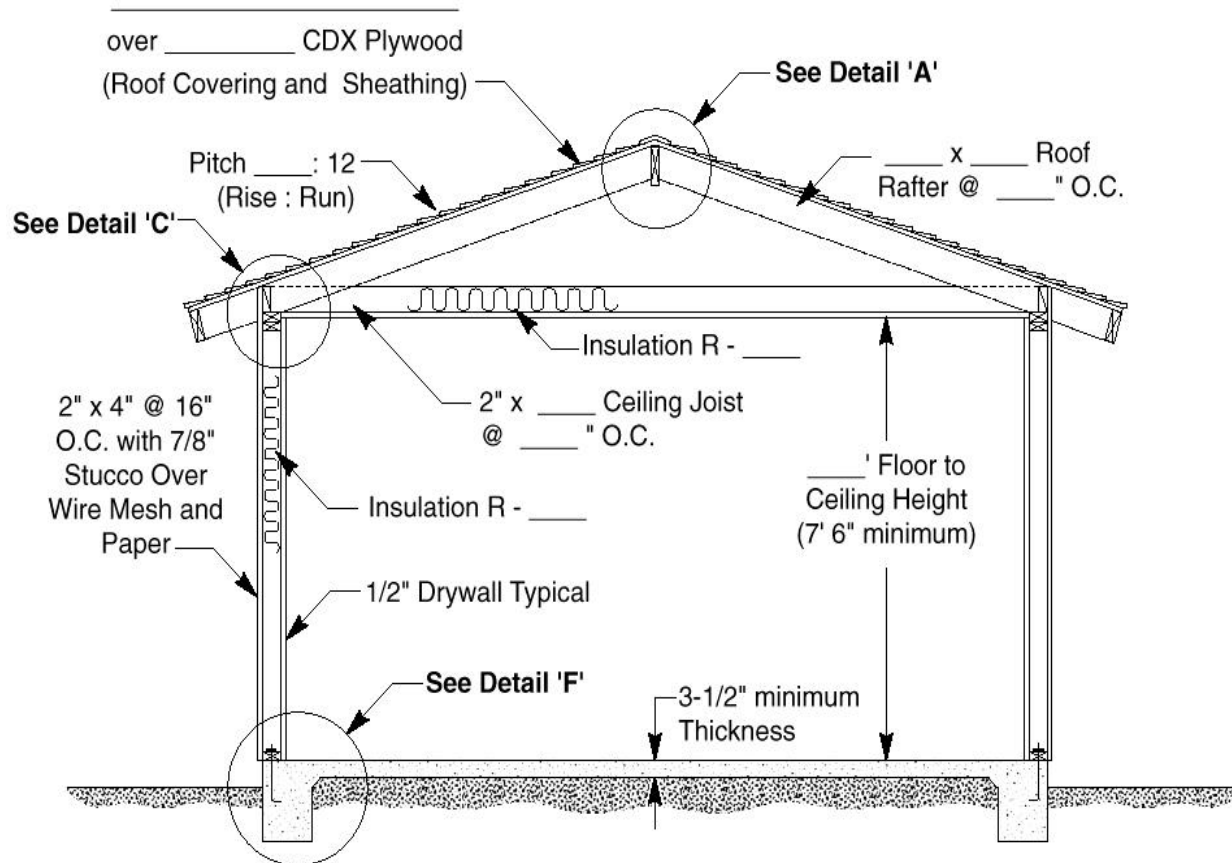


Figure 3/ Typical Cross Section View, Slab Floor with Vaulted Ceiling

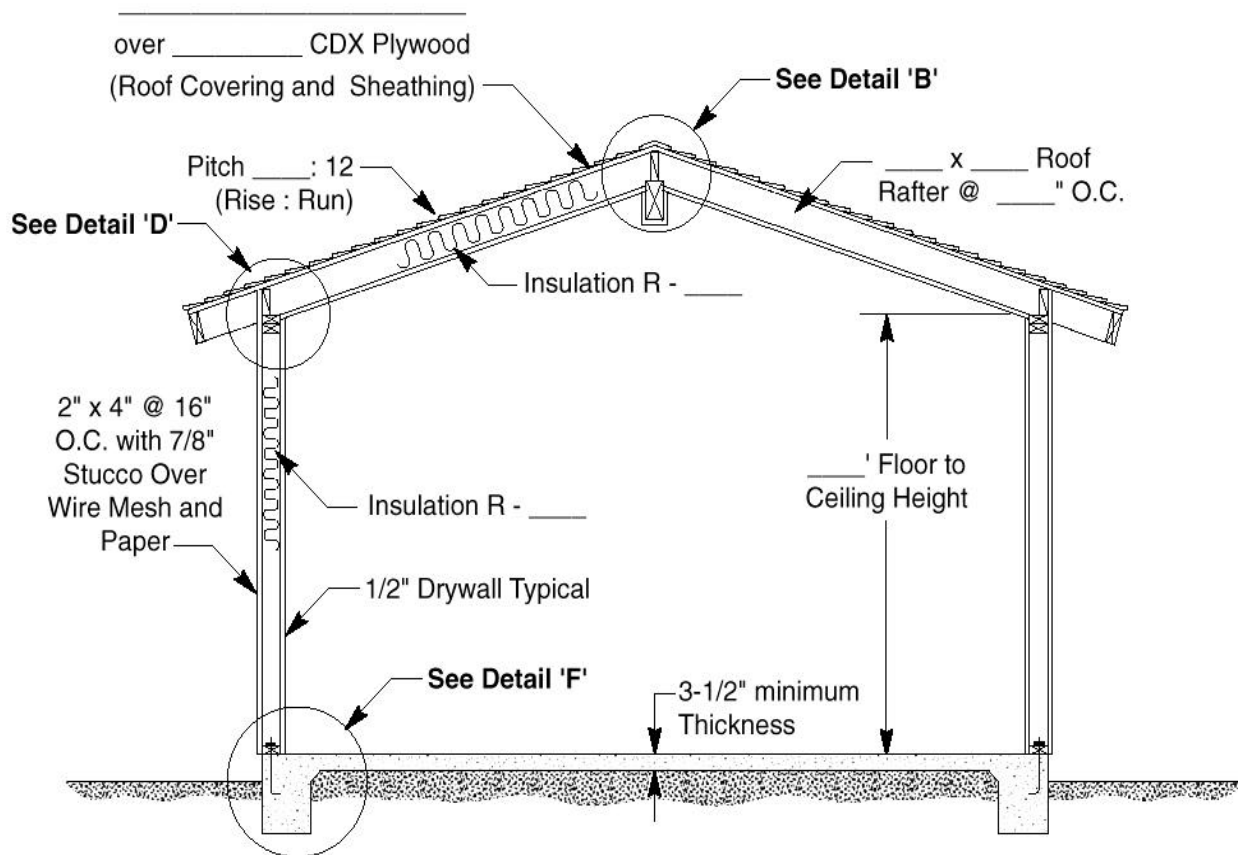


Figure 4/ Typical Cross Section View, Raised Floor with Ceiling Joist

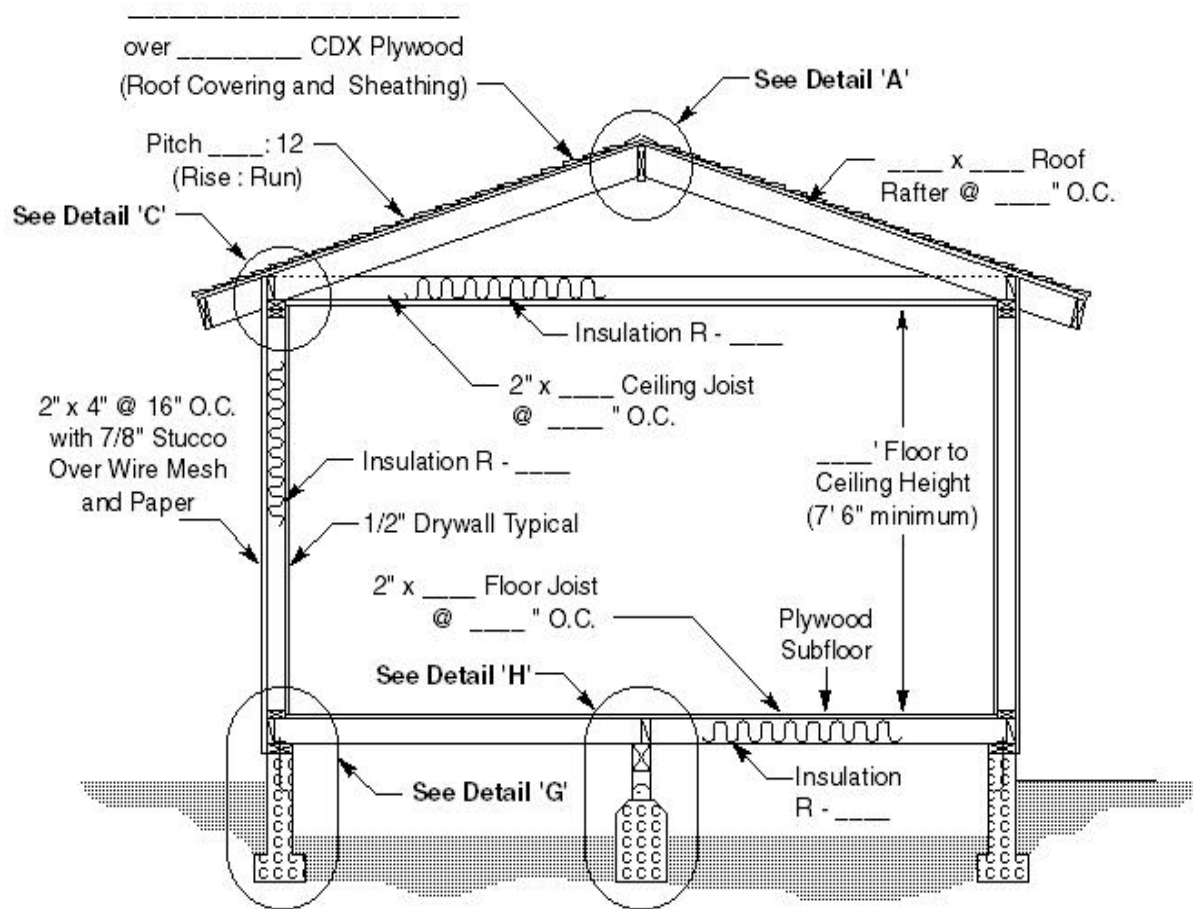
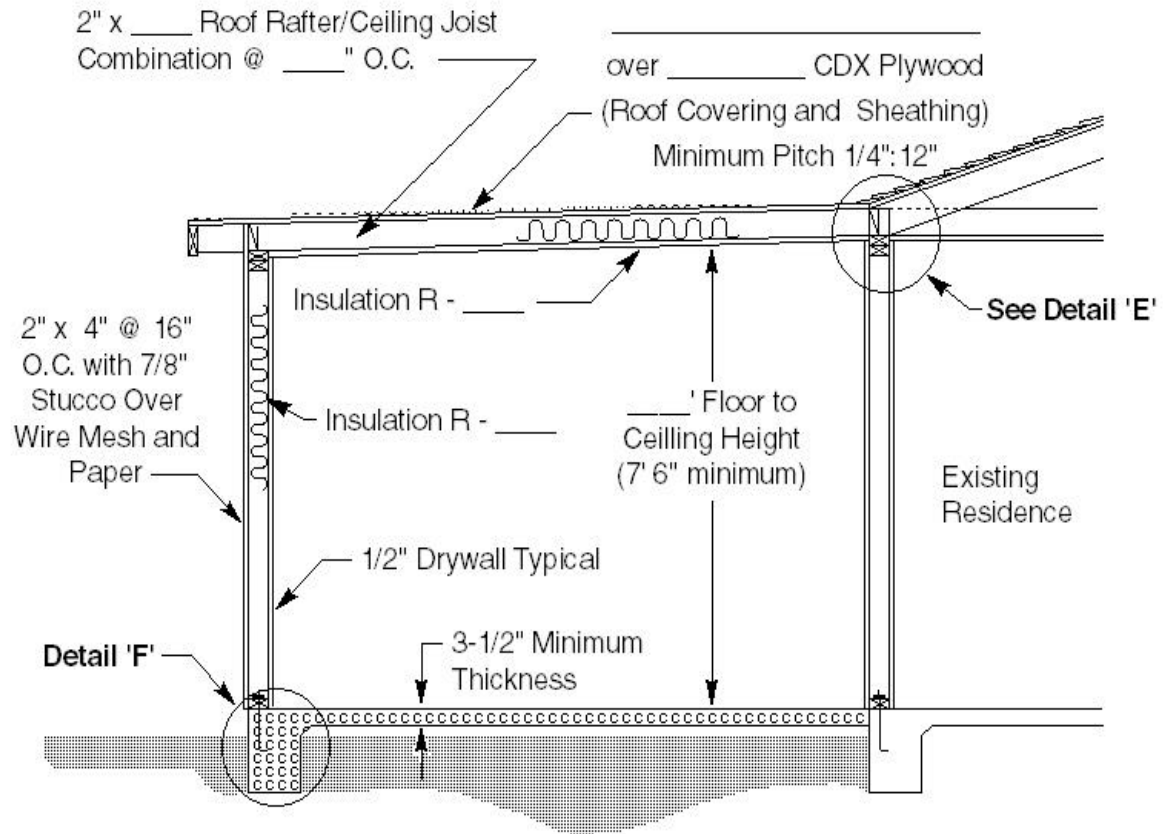
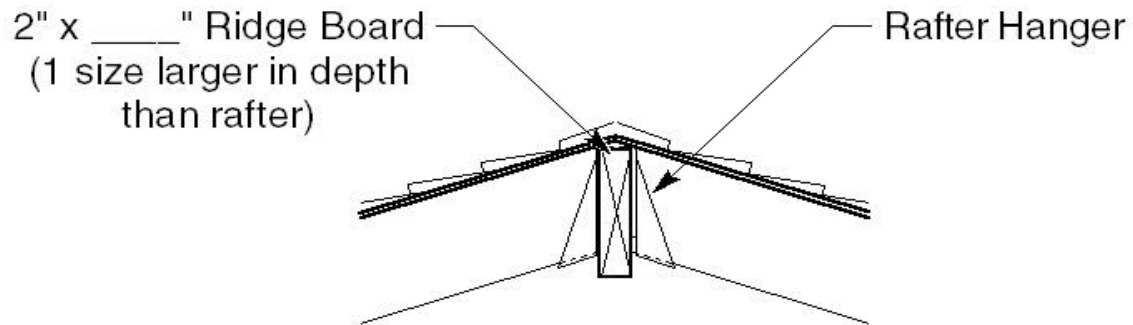


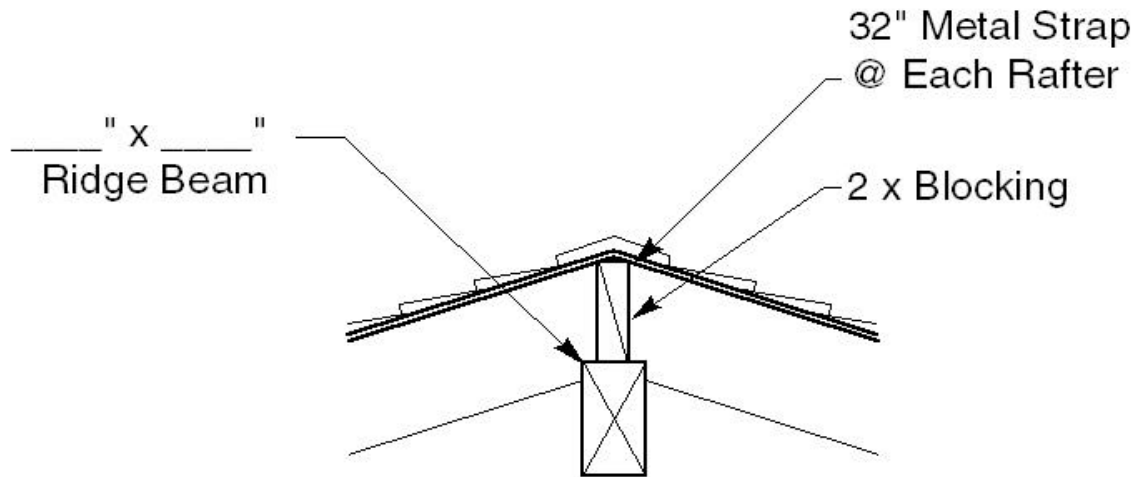
Figure 5/ Typical Cross Section View, Slab Floor with Shed Roof



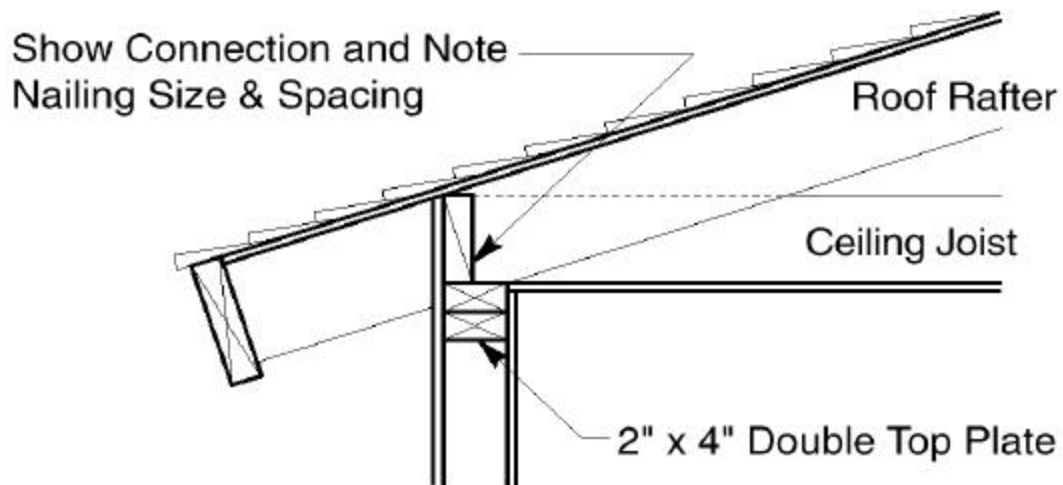
Detail "A"/ Typical Roof Connection, Non-Load Bearing Ridge



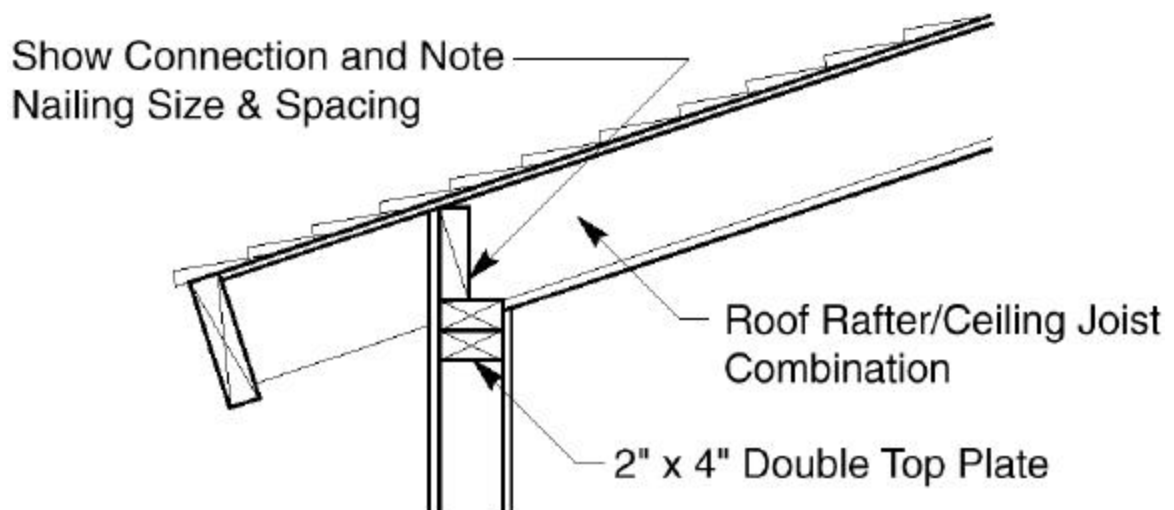
Detail "B"/ Typical Roof Connection, Load Bearing Ridge



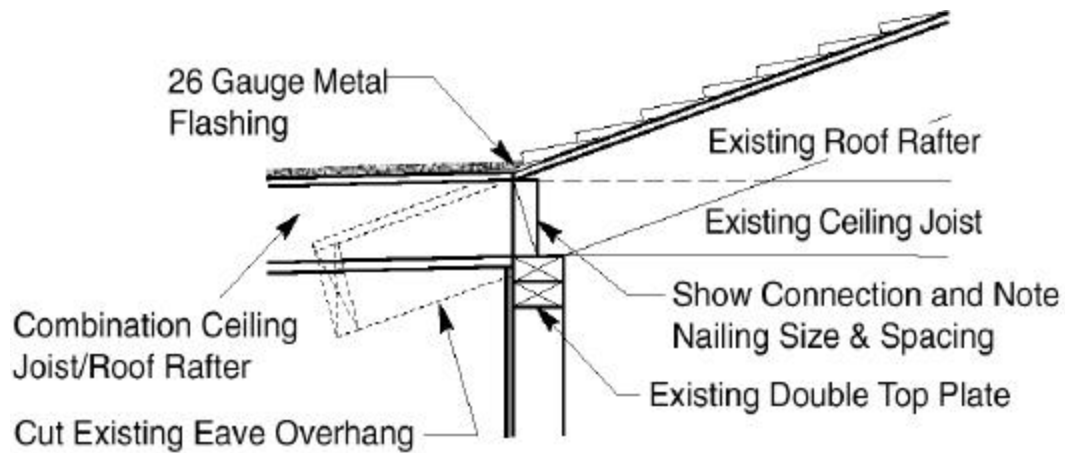
Detail "C"/ Typical Roof Connection With Ceiling Joist



Detail "D"/ Typical Roof Connection With Vaulted Ceiling



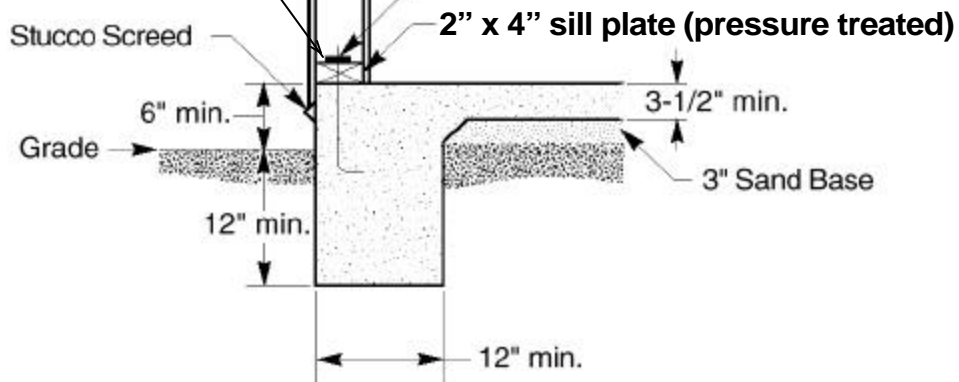
Detail "E"/ Typical Roof Connection, Shed Roof



Detail "F"/ Typical Floor Connection, Continuous Footing

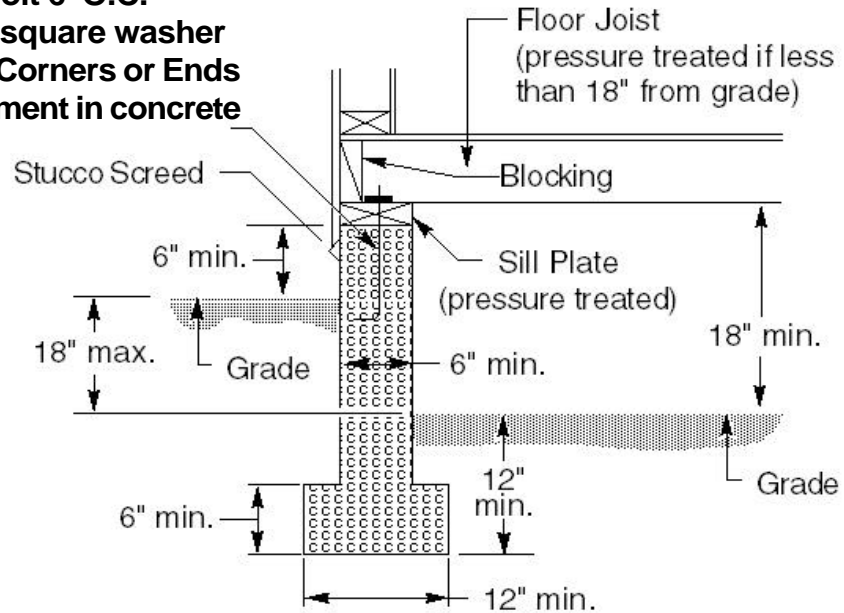
Plate washers a minimum of 2 inch by 2 inch by 3/16 inch thick shall be used on each bolt.

5/8" x 10" Anchor Bolt 6' O.C.
with 2" x 2" x 3/16" square washer
12" Maximum from Corners or Ends
7" minimum embedment in concrete



Detail "G"/ Typical Floor Connection, Foundation or Stem Wall

**5/8" x 10" Anchor Bolt 6' O.C.
with 2" x 2" x 3/16" square washer
12" Maximum from Corners or Ends
7" minimum embedment in concrete**



Detail "H"/ Typical Floor Connection, Square Pad footing

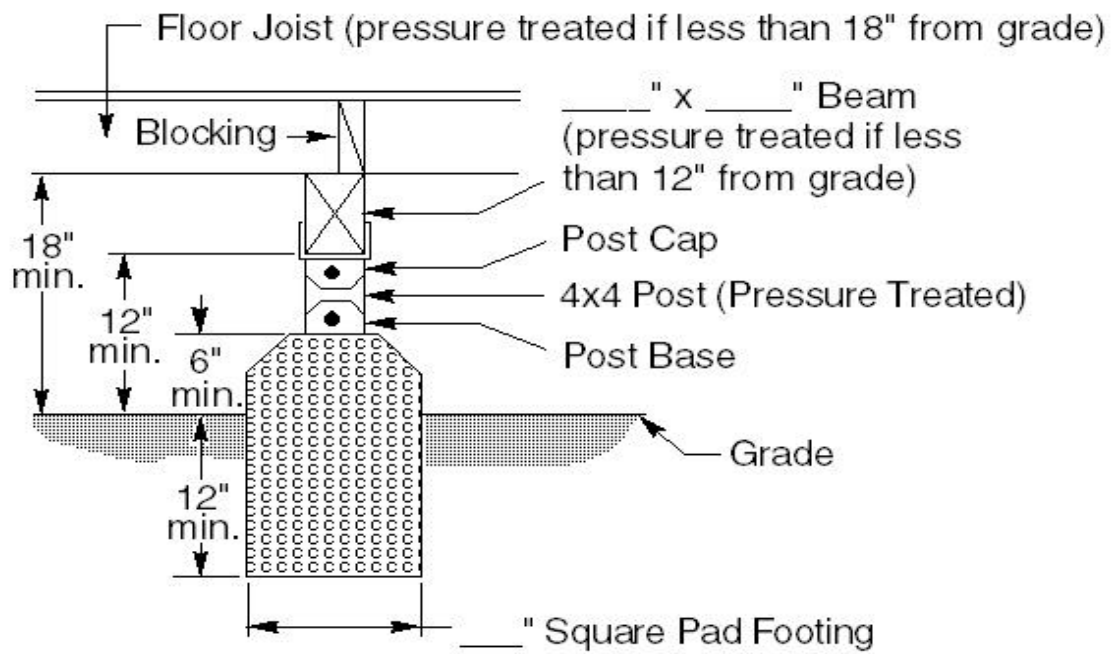


TABLE 23-IV-C-1-BRACED WALL PANELS ¹									
SEISMIC ZONE	CONDITION	CONSTRUCTION METHOD ^{2,3}							RACED PANEL LOCATION AND LENGTH ⁴
		1	2	3	4	5	6	7	
2B, 3 and 4	One story, top of two story or three story	X	X	X	X	X	X ⁶	X	Each end and not more than 25 feet on center
	First story of two story or second of three story	X	X	X	X ⁵	X	X ⁶	X	Each end and not more than 25 feet on center but not less than 25% building length ⁷
	First story of three story	X	X	X	X ⁵	X	X ⁶	X	Each end and not more than 25 feet on center but not less than 40% building length ⁷

¹This table specifies minimum requirements for braced panels which form interior or exterior braced wall lines.

²See Section 2320.11.3 for full description.

³See Section 2320.11.4 for alternate braced panel requirement.

⁴Building length is the dimension parallel to the braced wall length.

⁵Gypsum wallboard applied to supports at 16 inches on center.

⁶Not permitted for bracing cripple walls in Seismic Zone 4. See Section 2320.11.5.

⁷The required lengths shall be doubled for gypsum board applied to only one face of a braced wall panel.

TABLE 23-II-A-1-EXPOSED PLYWOOD PANEL SIDING		
MINIMUM THICKNESS ¹ (inch)	MINIMUM NUMBER OF PLIES	STUD SPACING (inches) PLYWOOD SIDING APPLIED DIRECTLY TO STUDS OR OVER SHEATHING
3/8	3	16 ²
1/2	4	24

¹Thickness of grooved panels is measured at bottom of grooves.

²May be 24 inches if plywood siding applied with face grain perpendicular to studs or over one of the following:

(1) 1-inch board sheathing, (2) 7/16-inch wood structural panel sheathing or (3) 3/8-inch wood structural panel sheathing with strength axis (which is the long direction of the panel unless otherwise marked) of sheathing perpendicular to studs.

TABLE 23-IV-D-1-WOOD STRUCTURAL PANEL WALL SHEATHING ¹ (Not exposed to the weather, strength axis parallel or perpendicular to studs)				
MINIMUM THICKNESS (inch)	PANEL SPAN RATING	STUD SPACING (inches)		
		Sheathing under Coverings Specified in Section 2310.4		
		Siding Nailed to Studs	Sheathing Parallel to Studs	Sheathing Perpendicular to Studs
5/16	12/0, 16/0, 20/0 Wall-16 o.c.	16	—	16
3/8, 15/32, 1/2	16/0, 20/0, 24/0, 32/16 Wall-24 o.c.	24	16	24
7/16, 15/32, 1/2	24/0, 24/16, 32/16 Wall-24 o.c.	24	24 ²	24

¹In reference to Section 2320.11.3, blocking of horizontal joints is not required.

²Plywood shall consist of four or more plies.

TABLE 23-IV-D-2-ALLOWABLE SPANS FOR PARTICLEBOARD WALL SHEATHING ¹ (Not exposed to the weather, long dimension of the panel parallel or perpendicular to studs)			
GRADE	THICKNESS (Inch)	STUD SPACING (inches)	
		Sheathing under Coverings Specified in Section 2310.4	
		Siding Nailed to Studs	Parallel or Perpendicular to Studs
M-1 M-S	3/8	16	16
M-2 "Exterior Glue"	1/2	16	16

¹In reference to Section 2320.11.3, blocking of horizontal joints is not required.

TABLE 25-I-ALLOWABLE SHEAR FOR WIND OR SEISMIC FORCES IN POUNDS PER FOOT FOR VERTICAL DIAPHRAGMS OF LATH AND PLASTER OR GYPSUM BOARD FRAME WALL ASSEMBLIES ¹							
TYPE OF MATERIAL	THICKNESS OF MATERIAL	WALL CONSTRUCTION	NAIL SPACING ² MAXIMUM (inches)	SHEAR VALUE	MINIMUM NAIL SIZE ³		
1. Expanded metal, or woven wire lath and portland cement plaster	7/8"	Unblocked	6	180	No. 11 gage, 1 1/2" long, 7/16" head No. 16 gage staple, 7/8" legs		
2. Gypsum lath	3/8" lath and 1/2" plaster	Unblocked	5	100	No. 13 gage, 1 1/8" long, 19/64" head, plasterboard blued nail		
3. Gypsum sheathing board	1/2" x 2' x 8'	Unblocked	4	75	No. 11 gage, 1 3/4" long, 7/16" head, diamond-point, galvanized		
	1/2" x 4'	Blocked	4	175			
	1/2" x 4'	Unblocked	7	100			
4. Gypsum wallboard or veneer base	1/2"	Unblocked	7	100	5d cooler (0.086" dia., 15/8" long, 15/64" head) or wallboard (0.086" dia., 15/8" long, 9/32" head)		
			4	125			
		Blocked	7	125			
			4	150			
	5/8"	Unblocked	7	115	6d cooler (0.092" dia., 17/8" long, 1/4" head) or wallboard (0.0915" dia., 17/8" long, 19/64" head)		
			4	145			
		Blocked	7	145			
			4	175			
		Blocked Two ply	Base ply: 9 Face ply: 7	250		Base ply-6d cooler (0.092" dia., 1 7/8" long, 1/4" head) or wallboard (0.0915" dia., 1 7/8" long, 19/64" head) Face ply-8d cooler (0.113" dia., 2 3/8" long, 9/32" head) or wallboard (0.113" dia., 2 3/8" long, 3/8" head)	